

## RESEARCH COMMUNICATION

## Acute Effects of Dokha Smoking on the Cardiovascular and Respiratory Systems among UAE Male University Students

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### Abstract

**Background:** In the United Arab Emirates (UAE) tobacco use is rampant. A less reported, yet widely used form of smoking native to UAE is midwakh or dhokha. The aim of the study is to assess the acute effects of smoking dokha (Arabian pipe) on the cardiovascular and respiratory systems among male university students in the UAE. **Method:** A quasi-experimental study was conducted among 97 male volunteers aged more than 17 years. Blood pressure, heart rate and respiratory rate of each participant, were measured before and immediately after smoking. A self administered questionnaire was used to collect personal details and data about smoking pattern. **Results:** Mean increases in systolic blood pressures ( $12 \pm 1$  mmHg), heart rates ( $20 \pm 2$  bpm) and respiratory rates ( $4 \pm 1$  breaths/min) were observed ( $p < 0.001$ ). A mean decrease in diastolic blood pressures ( $1 \pm 1$  mmHg) was observed ( $p = 0.483$ ). **Conclusion:** Smoking dokha has a significant acute effect on systolic blood pressure, heart rate and respiratory rate. Anti smoking campaigns must address the ill effects of this form of smoking. Results from the study warrant further research into this method of smoking which is becoming more popular.

**Keywords:** Dokha - midwakh - smoking - blood pressure - heart rate - respiratory rate - UAE

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### Introduction

Globally, use of tobacco products is increasing with more than one billion smokers in the world. Tobacco use kills 5.4 million people a year and accounts for one in 10 adult deaths worldwide. If current trends continue, 650 million people alive today will eventually die from tobacco-related diseases. In the United Arab Emirates 14.3% of young males, 24% of adult males, 2.9% of young females and 1% of adult females are reported to be current cigarette smokers (Fikri M & Bassam H, 2002). The overall reported smoking prevalence among university students in 2007 was 15.1%, cigarette smokers 9.4% and water-pipe (shisha) smokers. While 8.9% women were cigarette smokers, 26.2% were water-pipe smokers (Mandil et al., 2007). Another study in a medical university in 2010 reported 25% prevalence for any type of tobacco use; 23.1% for cigarette, 23.1% for shisha, and 11.5% for midwakh (Sreedharan et al., 2010). In the UAE tobacco use is commonly as cigarettes and shisha (Fikri & Bassam, 2002; Mandil et al., 2007) but a less reported yet widely used form of smoking native to UAE and Iran is midwakh or dhokha. Augmented by the smoking ban in public areas (Ali, 2004), restriction on the sale of tobacco products to minors and the recent closing down of shisha cafes, youth are looking for alternate methods of smoking, making midwakh use a more popular alternative.

Midwakh also spelled medwakh, is a small pipe of

Arabian origin. Dokha, a sifted preparation of Iranian tobacco mixed with aromatic leaf and bark herbs, is smoked in it. When smoked, the user enters a light-headed state (known as “buzz”) for a short period of time. The benefits perceived are, satisfying of nicotine cravings with relatively small quantities (0.5-mg. per serving) of tobacco (Sreedharan et al., 2010) reducing carbon monoxide and eliminating the nuisance of side-stream smoke. Interviews with dokha users and tobacco shop employees revealed that some dokha users also adulterate their dokha with intoxicating substances to enhance the experience of getting a head rush. Some of the most commonly reported adulterants were dried powdered black ants and powdered paracetamol, and in extreme cases poisonous derivatives such as dried powdered scorpion tails.

The main alkaloid in all forms of tobacco used above is Nicotine which is responsible for the addictive effect of tobacco. It is absorbed readily from tobacco smoke, and its concentration rises over 6-8 hours during the day in regular smokers (Benowitz, 1996). This powerful alkaloid can pass through the blood brain barrier and bind to nicotinic receptors in the central nervous system (Burns, 2011; Hibbs & Zambon, 2011) thereby promoting catecholamine (adrenaline) release. This stimulates cardiac contractility and constriction of the blood vessels, causing acute temporary rise of heart rate and arterial blood pressure after a smoking session of just 30 minutes returning to normal within 20 minutes of withdrawal of the cigarette.

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In chronic use, excess sympathetic stimulation promoting continuous rises in heart rate and cardiac output can cause flow turbulence which may cause damage to the lining of blood vessels. Stimulation of parasympathetic ganglia in the bronchi by nicotine can cause constriction of the airways and present as shortness of breath and tachypnoea. No study to date has been done identifying the acute effects of smoking midwakh on the heart rate, blood pressure and respiratory rate. The present study was conducted to substantiate the extent of the acute effects of dokha smoking on the cardiovascular and respiratory systems, to provide evidence for planning appropriate health education, particularly for adolescents and young children who are prone to undertake such risk behaviors and harmful practices especially with the age limit set for purchase of cigarettes in the country.

### Materials and Methods

The study used a quasi-experimental design, before–after without control, to assess the acute effect of dokha smoking among university students from three educational institutions in Sharjah and Ajman. Ninety seven male volunteers aged more than 17 years who smoke dokha were included by consecutive sampling. Systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR) and respiratory rate (RR) were measured immediately before and after smoking dokha. The time of measurement was decided on the basis of the results of the pilot study on 3 participants before, immediately, 2 minutes, 4 minutes and 6 minutes after smoking dokha, wherein an increase was noted in SBP, HR, and RR only when the variables were measured immediately after the last puff. The participants also completed a self administered, pilot tested questionnaire which included their personal details, pattern of smoking, reasons for preference of dokha, source of introduction, and knowledge about harmful health effects.

Data was collected in November- December 2009 after obtaining permission from the institutions. Each data collection station was set up in an area isolated from the respective main college/university campus. Inclusion criteria were male university Dokha smokers aged 16 years and above who had not smoked any form of tobacco within the previous half an hour. The team explained the purpose of the study and obtained verbal consent from those who fulfilled the inclusion criteria and volunteered to participate. The participants remained seated calm for 5 minutes, then blood pressure was measured using a Riester® mercury sphygmomanometer, HR by palpation of radial artery and RR by inspection of chest movements. The sphygmomanometer cuff was left strapped to the arm for the measurement ‘after’. The participant smoked dokha, number of puffs according to each one’s own comfort level and usual practice. Immediately after the participant had finished smoking, the measurements were repeated without any delay. The volunteers remained seated throughout the study period. After the second measurement the self administered questionnaire was completed and handed in. Data was analyzed using SPSS 17.0 version. Paired ‘t’ test was used to compare between

the means.

### Results

Ninty-seven male university students participated in the present study; 11% Emaratis, 44% other Arabs and 44% other nationalities. The mean age of the study group was 21.29 years (SD 2.25); 92.8% were single, and others married or engaged.

Table 1 shows SBP, DBP, HR and RR of dokha smokers before and immediately after a smoking session. There was a significant increase in Systolic blood pressure, heart rate and respiratory rate after the smoking session. Mean increases in systolic blood pressures (12 ± 1 mmHg), heart rates (20 ± 2 beats per minute) and respiratory rates (4 ± 1 breaths/min) were observed (p < 0.001). A mean decrease in diastolic blood pressures (1 ± 1 mmHg) was observed (p = 0.483)

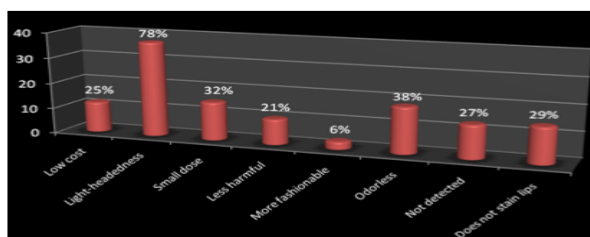
As for the dokha smoking duration, 60.8% of the participants started 1-5 years ago, 22% smoked for more than five years and 16.5% for less than one year. Occasional dokha smokers constituted 46.4% of the

**Table 1. SBP, DBP, HR and RR of Dokha Smokers before and Immediately after a Smoking Session (n = 97)**

Variables	Mean and SD		P value
	Before	After	
Systolic blood pressure (mm of Hg.)	129.2 (14.02)	141.33 (19.51)	0.0001
Diastolic blood pressure (mm of Hg.)	75.54 (12.34)	74.97 (12.25)	0.483
Heart rate (beats per minute)	83.63 (14.85)	103.29 (20.00)	0.0001
Respiratory rate (breaths/min)	20.53 (8.72)	24.91 (6.31)	0.0001

**Table 2. General Smoking Practices and Perceptions on Harmful Effects of Dokha Smoking (n = 97)**

Practices and perceptions	Yes (%)	No (%)
Smoke other forms of tobacco	84 (86.6%)	13 (13.4%)
Prefer dokha smoking over other forms of smoking	41 (42.3%)	56 (57.7%)
Tried to quit smoking	67 (69.1%)	30 (30.9%)
Believe that they will be able to quit smoking dokha	71 (73.2%)	26 (26.8%)
Believe dokha smoking is less injurious to health than other forms of smoking	36 (37.1%)	61 (62.9%)
Believe that dokha smoking is more addictive than cigarette smoking	36 (37.1%)	61 (62.9%)



**Figure 1. Reasons for the Preference of Dokha Smoking Over Other Forms (n = 97)**

volunteers whereas 53.6% smoked daily; 32% of the total smoked dokha more than five times a day.

Figure 1 shows the common reasons for preference of dokha over other forms of smoking on a multiple response question where the students could choose more than one option. The most common reason was the stronger sensation of light-headedness or "buzz" (78%), other reasons included lack of odor, the small dose required to satisfy nicotine craving, absence of stain on lips, low cost and feeling that it was less harmful (21%).

Table 2 shows that 86.6% of participants smoked other forms of tobacco as well, but 42% preferred dokha. Most participants (69%) had tried to quit smoking previously; however 73% still believed that they would be able to quit smoking. Among these dokha users, 37% believed that dokha smoking is more addictive and less injurious to health than other forms of smoking.

A multiple response question on the other forms of tobacco smoked in addition to smoking dokha, that cigarettes (89%) and water pipes (74%) were the other most popular forms.

## Discussion

Study was done to assess the acute effect of dokha smoking among university students. The observed acute effects of smoking dokha on the cardio-respiratory systems were a significant increase in systolic blood pressure, heart rate and respiratory rate. There was no significant change in the diastolic blood pressure. Since there are no published studies on the effect of smoking dhokha on the cardio respiratory systems we have compared the results with acute effects of other forms of smoking, shisha or water pipe smoking is popular not only in the Middle East but also outside the Middle East region (Maziak & Ward, 2004; Knishkowsky & Amitai, 2005). Study in Ajman, UAE, the mean increases in systolic blood pressure to be  $(16 \pm 1 \text{ mmHg})$ , diastolic blood pressure  $(2 \pm 0.7 \text{ mmHg})$ , heart rate  $(6.30 \pm 0.60 \text{ bpm})$  and respiratory rate  $(2 \pm 2 \text{ breaths/min})$  ( $p < 0.001$ ) (Shaikh et al., 2008) after a water-pipe smoking session among 20 normotensive individuals SBP increased from  $110 \pm 13$  to  $123 \pm 12 \text{ mmHg}$ , ( $p = 0.004$ ), DBP from  $67 \pm 11$  to  $81 \pm 11 \text{ mmHg}$ , ( $p = 0.0002$ ) and pulse pressure decreased  $(43 \pm 10$  to  $41 \pm 9 \text{ mmHg}$ ,  $p = 0.46$ ) (Al-Kubati et al., 2006). Study on cigar smoking and its effect on arterial stiffness showed that both radial and aortic systolic pressure and the pulse pressure increased significantly, indicating for the first time that cigar smoking acutely increases stiffness of large arteries and wave reflection (Vlachopoulos et al., 2004). Extensive research has been done and documented on the acute effects of smoking cigarettes. As early as (Elliott, 1968) it was proven that cigarette smoking caused elevations in HR of about 20 bpm. Study by (Karakaya, 2007) showed that cigarette smoking alters heart rate variability [HRV] parameters, particularly within the first 5 to 10 minutes after smoking.

Regarding frequency of smoking dokha, 46% reported occasional smoking while the others smoked daily, 32% smoked more than 5 times a day. The most common reason for their choice of smoking dokha over other forms

(78%) was the stronger sensation of light headedness, lack of odour absence of staining of lips and its low cost, all these benefits may seem attractive to a teenager who has less access money and more concern for appearance as well as a need to practice quick smoking more secretly.

However the volunteers may not be representative of the actual proportion of dokha smokers in the country by age, gender, nationality or region as it was only conducted on male volunteers from three institutions, and the dose of tobacco was variable, it still highlights the importance of more controlled studies for acute effects and long term follow up for possible associations with chronic diseases.

In conclusion, the study showed that dokha has acute cardio-respiratory effects similar to other forms of smoking. In the context of ban on minors accessing cigarettes and the resultant increase in the number of youth engaging in dokha smoking the study provides evidence on the importance of recognizing and providing public education on the health effects of dokha smoking. The results of this study will help policy makers on tobacco control in the UAE to include this form of smoking in their health education campaigns based on evidence.

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## References

- Ali Mirza Z (2004). Anti smoking news from the Middle east Middle East Journal of Family Medicine, 2 (5). Available at URL: [http://mejfm.com/journal/Oct2004/PDFs/Anti\\_Smoking\\_News.pdf](http://mejfm.com/journal/Oct2004/PDFs/Anti_Smoking_News.pdf) (Accessed on 12 July 2009).
- Al-Kubati M, Al-Kubati AS, Al Absi M, et al (2006). The short-term effect of water-pipe smoking on the baroreflex control of heart rate in normotensives. *Auton Neurosci*, **126**, 146-9.
- Benowitz NL (1996). Pharmacology of nicotine: addiction and therapeutics. *Ann Rev Pharmacol Toxicol*, **36**, 597-613.
- Burns DM (2011). Nicotine Addiction. In: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J, eds. Harrison's Principles of Internal Medicine. 18th ed. New York: McGraw-Hill. <http://www.accessmedicine.com/content.aspx?aID=9149831>. (Accessed on July 3, 2011).
- Elliott R, Thysell R (1968). A note on smoking and heart rate. *Psychophysiology*, **15**, 80-283.
- Federal anti-tobacco law (2009). Available from: URL: [http://www.uaeinteract.com/docs/Khalifa\\_issues\\_federal\\_anti\\_tobacco\\_law\\_/39082.htm](http://www.uaeinteract.com/docs/Khalifa_issues_federal_anti_tobacco_law_/39082.htm) posted on 07-01- 2010 (Accessed on July 10, 2010).
- Fikri M, Bassam H, Saab A (2002). Global youth tobacco survey (GYTS) United Arab Emirates report. Available at URL: <http://www.who.int/tobacco/surveillance/United%20Arab%20Emirates%20Report%202002.pdf> (accessed on 8th June 2009).
- Gulf News [Online]. Teenagers resort to Arabic pipe for a high, UAE published 6 May 2006 [cited]. Available from URL: <http://gulfnews.com/news/gulf/uae/general/teenagers-resort-to-arabic-pipe-for-a-high-1.235759>. (Accessed on July 24,

- 2010).
- Health Authority – Abu Dhabi, 2007 revised 2009. Policy on Sale of Tobacco Products to Minors and Through Vending Machines. [http://www.haad.ac/haad/Portals/0/Policies\\_Docs/Policy%20on%20Sale%20of%20Tobacco%20Products%20to%20Minors%20and%20Through%20Vending%20Machines.pdf](http://www.haad.ac/haad/Portals/0/Policies_Docs/Policy%20on%20Sale%20of%20Tobacco%20Products%20to%20Minors%20and%20Through%20Vending%20Machines.pdf) (Accessed on July 5, 2010)
- Hibbs RE, Zambon AC (2011). Chapter 11. Agents Acting at the Neuromuscular Junction and Autonomic Ganglia. In: Brunton LL, Chabner BA, Knollmann BC, eds. Goodman & Gilman's The Pharmacological Basis of Therapeutics. 12nd ed. New York: McGraw-Hill. <http://www.accessmedicine.com/content.aspx?aID=16661089>. (Accessed on July 3, 2011).
- Karakaya O (2007). Acute Effect of Cigarette Smoking on Heart Rate Variability. *Angiology*, **58**, 620-624.
- Knishkowsky B, Amitai Y (2005). Water-Pipe (Narghile) Smoking: An Emerging Health Risk Behaviour. *Pediatrics*, **116**, 113-9.
- Mandil A, Hussein A, Omer H, et al (2007). Characteristics and risk factors of tobacco consumption among University of Sharjah students, Eastern Mediterranean Health Journal 2005. *East Mediterr Health J*, **13**, 1449-58.
- Maziak W, Ward KD (2004). Tobacco smoking using a waterpipe: A re-emerging strain in a global epidemic. *Tobacco Control*, **12**, 327-33.
- Shaikh RB, Vijayaraghavan N, Sulaiman AS, et al (2008). The acute effects of Waterpipe smoking on the cardiovascular and respiratory systems. *J Prev Med Hyg*, **49**, 101-7.
- Sreedharan J, Jayakumari M, Mathew E, et al (2010). Tobacco use: Prevalence and Pattern among entry year students in a Medical University. In Proceedings of the 37th Annual conference of Indian association of Preventive and Social Medicine Ranchi India.
- Tobacco key facts. Available at URL: <http://www.who.int/topics/tobacco/facts/en/index.html> (accessed on 20 July 2010).
- Vlachopoulos C, Alexopoulos N, Panagiotakos D, et al (2004). Cigar smoking has an acute detrimental effect on arterial stiffness. *Am J Hypertens*, **17**, 199-303.
- World Health Organization (2005). Study group of Tobacco Regulation. Waterpipe Tobacco Smoking: Health effects, Research Needs and Recommended Actions by Regulators. Tobacco Regulation Advisory Note 1-12.